

75% of the entire dry material weight. Latex in the lower addition range is currently preferred. The latex is then precipitated onto the fibers by adding papermakers' alum or a cationic polymer. The use of a cationic polymer is, however, preferred.. The latex and fibers are usually negatively charged; therefore, the addition of a cationic ion forms a bridge between latex and fiber and also allows the latex to precipitate or coagulate together, thus coating the fibers and fillers. The slurry is then pumped or gravity-dropped to a stock tank where it is diluted with additional deionized water. The amount of this dilution is system-dependent. If required, additional chemicals that give the material wet strength and/or protection against water are added to the stock tank or in-line before the headbox. Chemicals used may include wet strength resins and sizing agents. The addition of chemicals and the type of chemicals used depend on the end use of the pad. Various types of semiconductor CMP processes require different pad properties. --.

IN THE CLAIMS:

Cancel claims 5, 8-10, 13, 15-17 and 20 without prejudice.

Amend claim 1 as follows.

CLAIM 1(AMENDED). A polishing pad for use in chemical mechanical polishing of substrates, said polishing pad having a polishing surface, comprising:

- a paper-making wet-laid process fibrous matrix consisting of cellulosic fibers;
- a binder for binding said fibrous matrix, said binder consisting of thermoset resin ;
- said fibrous matrix and said binder forming a porous structure by which polishing slurry and polishing debris during chemical mechanical polishing of substrates are

temporarily stored for subsequent rinsing away, and for enhanced flow-distribution of the polishing slurry.

[Amend claim 2 as follows.]

CLAIM 2(AMENDED). The polishing pad according to claim 1, said polishing pad being used in chemical mechanical polishing of substrates, wherein said thermoset resin consists of phenolic resin for binding said cellulosic fibers.

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[Amend claim 3 as follows.]

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CLAIM 3(AMENDED). The polishing pad according to claim 1, said polishing pad being used in chemical mechanical polishing of substrates, wherein said fibrous matrix consists of at least one of: cellulose fibers, lyocell and "ARAMID", and said thermoset resin consists of at least one of the following: Phenolic resin, epoxy, silicone, for binding said fibers.

[Amend claim 4 as follows.]

CLAIM 4(AMENDED). The polishing pad for use in chemical mechanical polishing of substrates according to claim 1, wherein said cellulosic fibers are chosen from the group consisting of: Cotton linters and wood pulp.

[Amend claim 14 as follows.]

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CLAIM 14(AMENDED). The polishing pad for use in chemical mechanical polishing of substrates according to claim 3, wherein said fibrous matrix is comprised of fibers having cross-sectional diameters of between 10 and 50 microns, and a length in the range of between .4 and 1.3mm.

Amend claim 18 as follows.

CLAIM 18(AMENDED). In a fiber matrix used as a medium for subsequent resin impregnation, for use in making polishing pads for use in chemical-mechanical process apparatuses for the chemical-mechanical polishing of substrates, the improvement comprising:

said fiber matrix being made by a paper-making wet-laid process comprising the following steps:

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- PR B' >
- (a) dispersing paper-making cellulosic fibers in water to form a paper-making slurry;
 - (b) delivering the paper-making slurry of said step (a) to a paper-making machine and making a paper sheet in said paper-making machine;
 - (c) said step (b) comprising draining water from the slurry to form a continuous paper sheet;
 - (d) drying the wet-laid continuous paper sheet of said step (c) for creating a relatively soft, compliant fiber matrix from which polishing pads for use in chemical mechanical polishing of substrates are formed.

[Add the following new claims.]

CLAIM 41(NEW). The method according to claim 18, wherein said step (a) further comprises adding thermoset resin material in addition to said paper-making cellulosic fibers and water to form said a paper-making slurry;

said method further comprising:

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- (e) curing said continuous paper sheet after said step (d).

CLAIM 42(NEW). The method according to claim 18, wherein said step (a) further comprises adding thermoset resin material in addition to said paper-making cellulosic fibers and water to form said a paper-making slurry;

said method further comprising:

- (e) cutting said continuous paper sheet after said step (d) into pad-sized blanks;
- (f) curing said pad-sized blanks after said step (e).

CLAIM 43(NEW). The method according to claim 18, wherein said method further comprises:

- (e) impregnating said continuous paper sheet with thermoset resin; and
- (g) curing said continuous paper sheet after said step (e).

CLAIM 44(NEW). The method according to claim 43, further comprising:

cutting said continuous paper sheet after said step (f) into CMP polishing pads.

CLAIM 45(NEW). Polishing pads for use in chemical mechanical polishing of substrates, each said polishing pad having a ground polishing surface and consisting of a porous fibrous matrix of paper-making fibers, fillers, and a binder for binding said fibrous matrix, said binder consisting of thermoset resin, said matrix and said binder forming a porous structure by which polishing slurry or polishing debris during chemical mechanical polishing of substrates are temporarily stored for subsequent rinsing away and for enhanced flow-distribution of the polishing slurry; said ground polishing surface

consisting of a ground surface in order that said matrix thereat is of open-pore construction and defines surface asperities by which said optimal distribution of polishing slurry during chemical mechanical polishing of substrates is achieved, so that polishing slurry may be readily absorbed and optimally distributed during chemical mechanical polishing of substrates, said polishing pads being made by a process comprising:

- (a) making said polishing pads using a wet-laid paper-making process;
- (b) said step (a) comprising forming a slurry of at least water, paper-making fibers, and latex;
- (c) mixing said slurry of said step (b) in order to disperse the fibers;
- (d) delivering said mixed slurry to a paper-making apparatus, and forming a wet-laid sheet;
- (e) drying the wet-laid sheet of said step (d);
- (f) adding thermoset resin binder;
- (g) said step (f) comprising at least one of: adding the thermoset resin during said step (b), and after said step (e);
- (h) curing the sheet;
- (h) cutting the sheet to form polishing pads of desired size;
- (i) grinding at least one surface face of each said polishing pad to form said asperities and to open the porous matrix for polishing slurry transport during CMP processes.

[Amend claim 23 as follows.]

CLAIM 23(AMENDED). A method of forming polishing pads for use in chemical mechanical polishing of substrates, comprising:

- (a) forming a fiber matrix sheet made of paper-making fibers on a paper-making machine;
- (b) impregnating the fiber matrix sheet with a binder material;
- (c) curing the binder material with heat to form a fiber matrix sheet that is relatively soft and compliant;
- (d) said step (b) comprising binding the fiber matrix with a thermoset resin.

ac [Amend claim 24 as follows.]

CLAIM 24(AMENDED). The method according to claim 23, wherein said step (d) comprises using a binder from at least one of the following: phenolic, epoxy, silicone, and modified phenolics, wherein said step (b) is done by soaking the fiber matrix sheet in a bath of liquid resin.

ad [Amend claim 27 as follows.]

CLAIM 27(AMENDED). The method according to claim 23, further comprising forming a grooved-surface pattern in the surface of the fiber matrix sheet.

[Amend claim 28 as follows.]

CLAIM 28. The method according to claim 27, wherein said step of forming a grooved - surface pattern is performed after the thermoset resin is fully cured.

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Conc'd

[Amend claim 29 as follows.]

CLAIM 29(AMENDED). The method according to claim 28, wherein said step of forming a grooved -surface pattern comprises embossing the grooved-surface pattern.

[Amend claim 32 as follows.]

CLAIM 32(AMENDED). In a chemical mechanical polishing apparatus for the polishing of substrates, which apparatus comprises a rotating platen, a polishing pad, having a polishing surface, attached to said rotating platen, an upper rotating member for retaining a wafer carrier for a wafer substrate, slurry means for introducing slurry onto the polishing pad, the improvement comprising:

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said polishing pad being of a porous structure and comprising a fibrous matrix consisting of paper-making fibers, said fibrous matrix consisting of a paper-machine produced paper sheet bound with a thermoset resin material; said polishing pad comprising voids in which said polishing slurry flows during chemical mechanical polishing of substrates and in which debris formed during the chemical mechanical polishing of substrates are temporarily stored.

[Amend claim 40 as follows.]

CLAIM 40(AMENDED). The chemical mechanical polishing apparatus for the polishing of substrates according to claim 32, wherein said fibrous matrix is comprised of fibers having cross-sectional diameters of between 10 and 50 microns, and a length in the range of between .4 and 1.3mm; said fibrous matrix making up between 30-80%, by weight, of said polishing pad.

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